

REMARKS

Claims 35-55 were previously pending in this patent application. Claims 35-55 stand rejected. Herein, Claims 35, 44, and 52 have been amended. Accordingly, after this Amendment and Response After Final Action, Claims 35-55 remain pending in this patent application. Further examination and reconsideration in view of the claims, remarks, and arguments set forth below is respectfully requested.

35 U.S.C. Section 103(a) Rejections

Claims 35, 38, 44, 50, and 52-55 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mui et al., U.S. Patent No. 6,037,265 (hereafter Mui) in view of Applicant's Admitted Prior Art (AAPA). Claims 36, 37, 39-43, 45-49, and 51 are rejected Mui et al., U.S. Patent No. 6,037,265 (hereafter Mui) in view of Applicant's Admitted Prior Art (AAPA), and further view of additional Examiner comments. These rejections are respectfully traversed. These rejections are respectfully traversed.

Independent Claim 35 recites:

A process for making a semiconductor structure comprising:
depositing a conductive layer upon a substrate comprising a silicon oxide-silicon nitride-silicon oxide (ONO) layer;
depositing a conductive adhesive layer between said substrate and said conductive layer, wherein said conductive adhesive layer has a minimum thickness required to provide adhesion between said

substrate and said conductive layer for a robust structure that can withstand subsequent processing, wherein said conductive adhesive layer has a thickness that is less than 300 angstroms; and

etching a portion of said conductive layer and a portion of said conductive adhesive layer utilizing a plasma ***without sacrificing said substrate***, wherein said ***plasma comprises an etchant***, wherein said ***etchant comprises chlorine and oxygen***, wherein said plasma is ionized and sustained by a first RF source, and wherein said plasma is accelerated by a second RF source. (emphasis added)

It is respectfully asserted that there is no suggestion, motivation, or teaching found in Mui and AAPA to combine them as recited in Independent Claim 35. Moreover, the combination of Mui and AAPA does not teach, suggest, or motivate all the limitations in Independent Claim 35.

In particular, Independent Claim 35 recites the limitations, "***etching a portion of said conductive layer and a portion of said conductive adhesive layer*** utilizing a plasma ***without sacrificing said substrate***," (emphasis added), "wherein said ***plasma comprises an etchant***," (emphasis added), and "wherein said ***etchant comprises chlorine and oxygen***" (emphasis added). Further, the Federal Circuit decision IN RE DANIEL S. FULTON and JAMES HUANG, 04-1267 (Fed. Cir. 2004) is being submitted and will be referred as IN RE FULTON. In the case IN RE FULTON, the appeals court held that the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives unless the disclosure criticizes, discredits, or otherwise discourages the solution provided by the alternative and claimed in the patent

application. (IN RE FULTON, page 8). Mui discloses etching a tungsten silicide layer or conductive layer (22) and a polysilicon layer or conductive adhesive layer (16) by using a first plasma etchant comprising a halogen (e.g., fluorine, chlorine, bromine, iodine, and astatine) and carbon monoxide; a second plasma etchant comprising a halogen, carbon monoxide, and a nitrogen-containing gas, a third plasma etchant comprising a halogen, carbon monoxide, and a gas selected from the group of HBr, BCl₃, and mixtures thereof; or a fourth plasma etchant comprising a halogen, carbon monoxide, and oxygen. [Mui; Col. 8, lines 12-27; Col. 8, lines 28-50; Col. 8, line 51 through Col. 9, line 7; Col. 9, lines 8-25].

Although Mui discloses four alternatives for the plasma etchant, Mui criticizes, discredits, or otherwise discourages the solution provided by the fourth alternative (i.e., a fourth plasma etchant comprising a halogen, carbon monoxide, and oxygen) which uses oxygen as in the invention of Independent Claim 35 which is directed to plasma comprising an etchant, wherein the etchant comprises chlorine and oxygen. Thus, Mui teaches away from the fourth plasma etchant comprising a halogen, carbon monoxide, and oxygen. In particular, Mui states in Example I that the third plasma etchant (halogen, carbon monoxide, and HBr) was used to etch a polysilicon layer formed on a gate oxide layer, wherein the gate oxide layer had no microtrenching. [Mui; Col. 16, lines 10-46].

Microtrenching is not desirable in the gate oxide layer. However, in Example II the carbon monoxide was replaced with He:O₂ (i.e., 70% by volume He and 30%

by volume O₂), wherein etching of the polysilicon layer caused the gate oxide layer to have microtrenching. [Mui; Col. 16, lines 50-59].

In Example III, the amount of carbon monoxide in the third plasma etchant (halogen, carbon monoxide, and HBr) was varied, illustrating that the polysilicon profiles after etching could be controlled by varying the amount of carbon monoxide in the etchant. [Mui; Col. 16, line 60 through Col. 17, line 5]. However, in Example IV, the carbon monoxide was replaced with various amounts of He:O₂ (i.e., 70% by volume He and 30% by volume O₂), resulting in the gate oxide layer having microtrenching and no control over the polysilicon profiles after etching regardless of the amount of He:O₂ employed. [Mui; Col. 17, lines 7-19].

Further, in Example V, a tungsten silicide layer or conductive layer and a polysilicon layer or conductive adhesive layer formed on a gate oxide layer were etched with the third plasma etchant (halogen, carbon monoxide, and HBr), resulting in the gate oxide layer not having microtrenching, a smooth profile of the etched edges, and erosion of 10 angstroms of the gate oxide layer. [Mui; Col. 17, line 20 through Col. 18, line 46]. However, in Example VI, the carbon monoxide was replaced with oxygen O₂ to etch the tungsten silicide layer or conductive layer and a polysilicon layer or conductive adhesive layer formed on the gate oxide layer, resulting in the gate oxide layer having microtrenching, a

wavy and not smooth profile of the etched edges, and erosion of 50 angstroms of the gate oxide layer. [Mui; Col. 18, lines 49-60].

In Examples II, IV, and VI, oxygen O₂ was used in the plasma etchant, but the etching results were unfavorable and undesirable compared to using a plasma etchant without oxygen O₂. Thus, Mui criticizes, discredits, or otherwise discourages the solution provided by the fourth plasma etchant (comprising a halogen, carbon monoxide, and oxygen) or any plasma etchant having oxygen. Therefore, Mui teaches away from the invention of Independent Claim 35, which is directed to plasma comprising an etchant, wherein the etchant comprises chlorine and oxygen. Moreover, in Examples V and VI, the etching of the tungsten silicide layer (or conductive layer) and the polysilicon layer (or conductive adhesive layer) formed on a gate oxide layer (or substrate) resulted in erosion of the gate oxide layer (or substrate) by 10 and 50 angstroms, respectively. In contrast, Independent Claim 35 is directed to etching a portion of the conductive layer and a portion of the conductive adhesive layer utilizing a plasma without sacrificing the substrate.

Furthermore, Mui describes that the thickness (of the polysilicon or the conductive adhesive layer) is more preferably from about 500 angstroms to 6000 angstroms, more preferably from about 1000 angstroms to about 3000 angstroms. [Mui; Col. 6, lines 9-14]. That is, Mui teaches away from a

conductive adhesive layer that has a thickness that is less than 300 angstroms.

The AAPA and the Examiner comments do not teach, suggest, or motivate the cited limitations of Independent Claim 35.

Therefore, it is respectfully submitted that Independent Claim 35 is patentable over the combination of Mui, AAPA, and Examiner comments and is in condition for allowance.

Dependent Claims 36-43 are dependent on allowable Independent Claim 35, which is allowable over the combination of Mui, AAPA, and Examiner comments. Hence, it is respectfully submitted that Dependent Claims 36-43 are patentable over the combination of Mui, AAPA, and Examiner comments for the reasons discussed above.

With respect to Independent Claim 44, it is respectfully submitted that Independent Claim 44 recites similar limitations as in Independent Claim 35. In particular, Independent Claim 44 recites the limitations, "forming a bit-line gate by ***selectively etching a portion of said conductive layer and a portion of said conductive adhesive layer without sacrificing said substrate*** utilizing a plasma, wherein said ***plasma comprises etchants chlorine and oxygen***," (emphasis added). As stated above, the combination of Mui, AAPA, and

Examiner comments fails to disclose the cited limitation. Therefore, Independent Claim 44 is patentable over the combination of Mui, AAPA, and Examiner comments and is in condition for allowance for reasons discussed in connection with Independent Claim 35.

Dependent Claims 45-51 are dependent on allowable Independent Claim 44, which is allowable over the combination of Mui, AAPA, and Examiner comments. Hence, it is respectfully submitted that Dependent Claims 45-51 are patentable over the combination of Mui, AAPA, and Examiner comments for the reasons discussed above.

With respect to Independent Claim 52, it is respectfully submitted that Independent Claim 52 recites similar limitations as in Independent Claim 35. In particular, Independent Claim 52 recites the limitations, "***selectively etching said conductive layer and said polysilicon layer without sacrificing said silicon oxide-silicon nitride-silicon oxide (ONO) layer***, to form said electrical interconnect on said ONO layer, utilizing a decoupled plasma, wherein said ***plasma comprises chlorine gas and oxygen gas***," (emphasis added). As stated above, the combination of Mui, AAPA, and Examiner comments fails to disclose the cited limitation. Therefore, Independent Claim 52 is patentable over

the combination of Mui, AAPA, and Examiner comments and is in condition for allowance for reasons discussed in connection with Independent Claim 35.

Dependent Claims 53-55 are dependent on allowable Independent Claim 52, which is allowable over the combination of Mui, AAPA, and Examiner comments. Hence, it is respectfully submitted that Dependent Claims 53-55 are patentable over the combination of Mui, AAPA, and Examiner comments for the reasons discussed above.

CONCLUSION

It is respectfully submitted that the above claims, arguments and remarks overcome all rejections and objections. All remaining claims (Claims 35-55) are neither anticipated nor obvious in view of the cited references. For at least the above-presented reasons, it is respectfully submitted that all remaining claims (Claims 35-55) are in condition for allowance.

The Examiner is urged to contact Applicant's undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Please charge any additional fees or apply any credits to our PTO deposit account number: 23-0085.

Respectfully submitted,

WAGNER, MURABITO & HAO, LLP

Dated: 8/12/2005

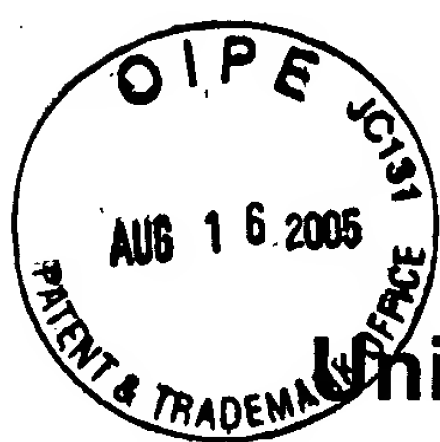
Jose S. Garcia

Jose S. Garcia
Registration No. 43,628

Two North Market Street, Third Floor
San Jose, CA 95113
(408) 938-9060

Attachment

IN RE DANIEL S. FULTON and JAMES HUANG, 04-1267 (Fed. Cir. 2004)



United States Court of Appeals for the Federal Circuit

04-1267
(Serial No. 09/122,198)

IN RE DANIEL S. FULTON and JAMES HUANG

Garth E. Janke, Birdwell & Janke, of Portland, Oregon, for appellants.

John M. Whealan, Solicitor, United States Patent and Trademark Office, of Arlington, Virginia, for the Director of the United States Patent and Trademark Office. With him on the brief were W. Asa Hutchinson III, Attorney-Advisor, and William LaMarca, Associate Solicitor.

Appealed from: United States Patent and Trademark Office
Board of Patent Appeals and Interferences



United States Court of Appeals for the Federal Circuit

04-1267

IN RE DANIEL S. FULTON and JAMES HUANG

DECIDED: December 2, 2004

Before MICHEL, RADER, and GAJARSA, Circuit Judges.

MICHEL, Circuit Judge.

Appellants Daniel Fulton and James Huang appeal from the decision of the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences ("Board"), affirming the examiner's rejection of appellants' application for a utility patent on grounds that the invention claimed would have been obvious under 35 U.S.C. § 103(a). The appeal was submitted for decision without oral argument on November 5, 2004. Because the Board's finding that the prior art suggested the desirability of the combination of shoe sole limitations claimed in appellants' patent application was supported by substantial evidence, we affirm.

Background

On July 24, 1997, appellants filed application number 09/122,198 (the "'198 application") for a utility patent directed to a shoe sole with increased traction. Claim 1, the only independent claim at issue, reads:

An improved shoe sole for increasing the resistance to slip on a contact surface, the sole comprising a bottom surface and defining a perimeter bounding a forefoot portion corresponding to the forefoot of the shoe and a heel portion corresponding to the heel of the shoe, wherein the sole extends generally along a fore-aft axis running from said heel portion to said forefoot portion, the sole further comprising a substantially regular

tiling array of projections projecting from said bottom surface, said projections terminating in hexagonal shaped projected surfaces spaced from said bottom surface in a direction for making contact with the contact surface, said projections being oriented so that opposite edges of said projected surfaces face generally in the directions of said fore-aft axis, said projected surfaces being substantially flat and parallel to the bottom surface to maximize the area of contact with the contact surface, said projections being spaced from one another to define substantially continuous channels therebetween for conducting liquid, said channels being open over at least most of said perimeter, said forefoot portion and said heel portion of the sole.

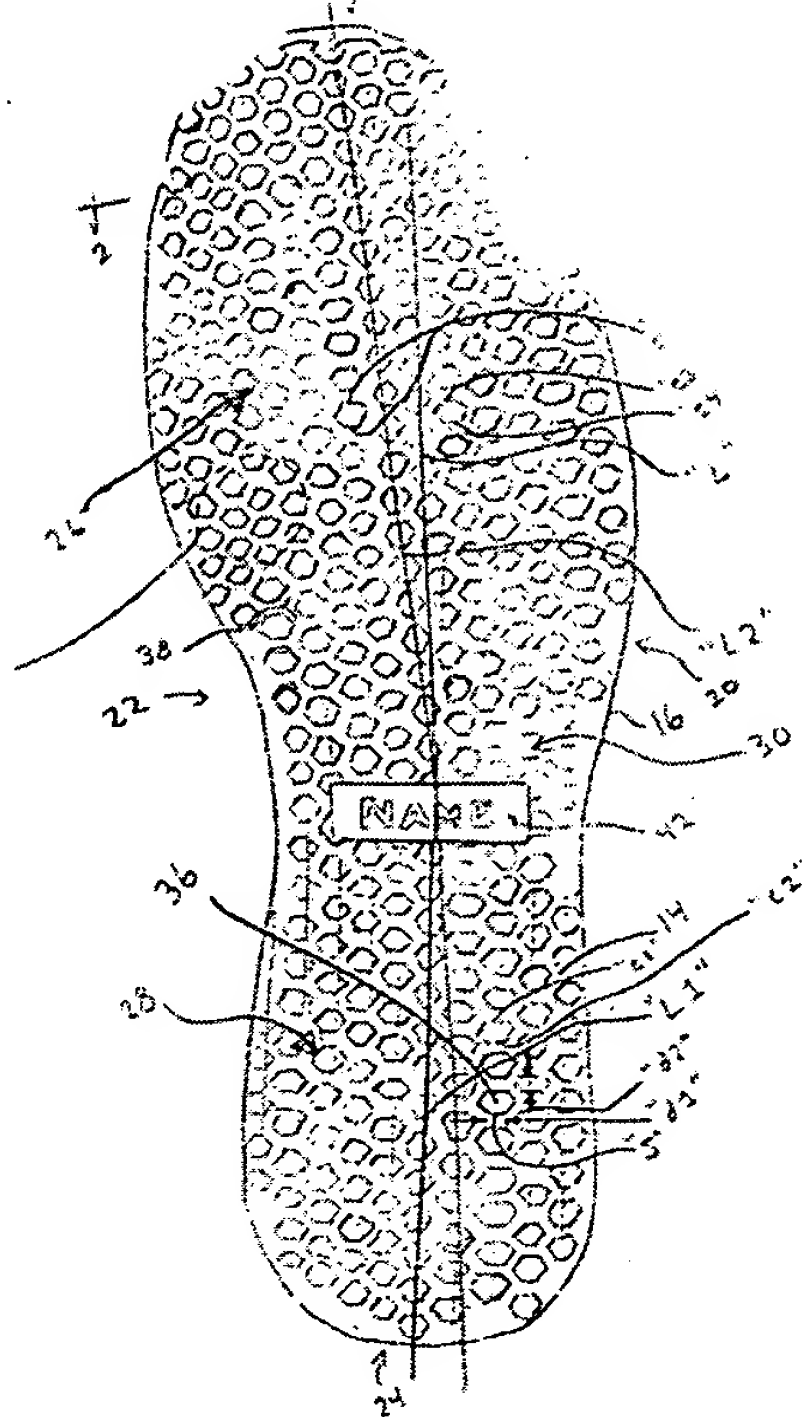
'198 application, at 7 (emphases added).

Three limitations of this claim are at issue, namely the limitations that: (A) the perimeter of the shoe is mostly open, (B) the projected surfaces, also called studs, are hexagonal in shape, and (C) the hexagonal shapes be oriented so that opposite edges of the hexagon “face generally in the directions of said fore-aft axis.” Id. A figure from the '198 application is reproduced below, with non-substantive modifications for simplicity of presentation.

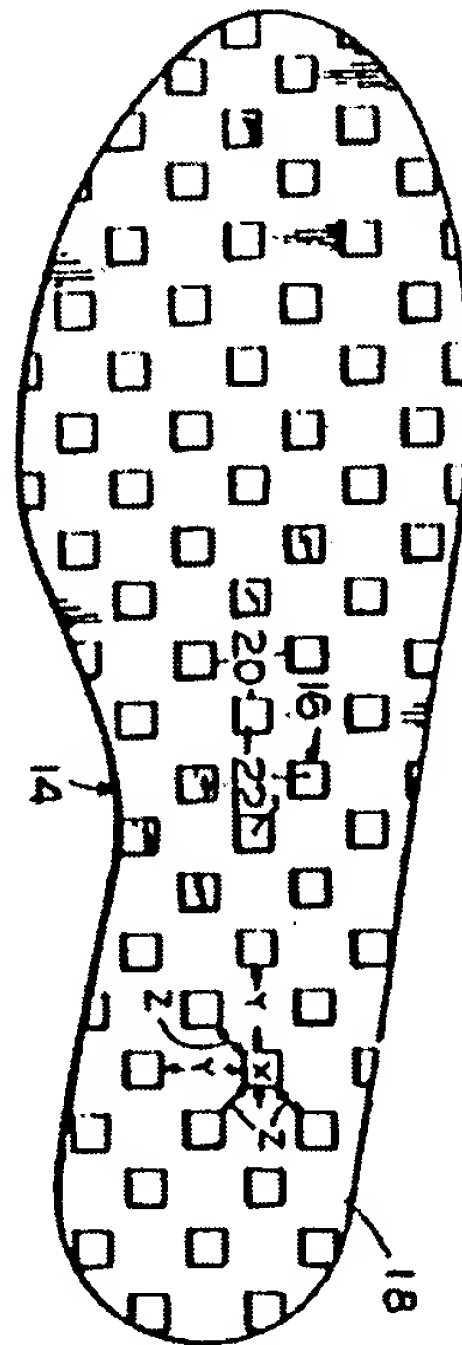
Prior art related to the '198 application includes U.S. Patent No. 3,793,750 (“Bowerman”), U.S. Design Patent No. 281,462 (“Pope”), U.S. Design Patent No. 263,645 (“Mastrantuone”), and United Kingdom Patent No. 513,375 (“Davies”). Figures from these patents are reproduced below.

As can be seen in the figures, the orientation of the projected surfaces in these figures is different. In this opinion, we will refer to the orientation in the '198 application, Bowerman, and Pope as a “facing” orientation because the front edge of each hexagonal projected surface faces forward and the orientation in Mastrantuone and Davies as a “pointing” orientation.

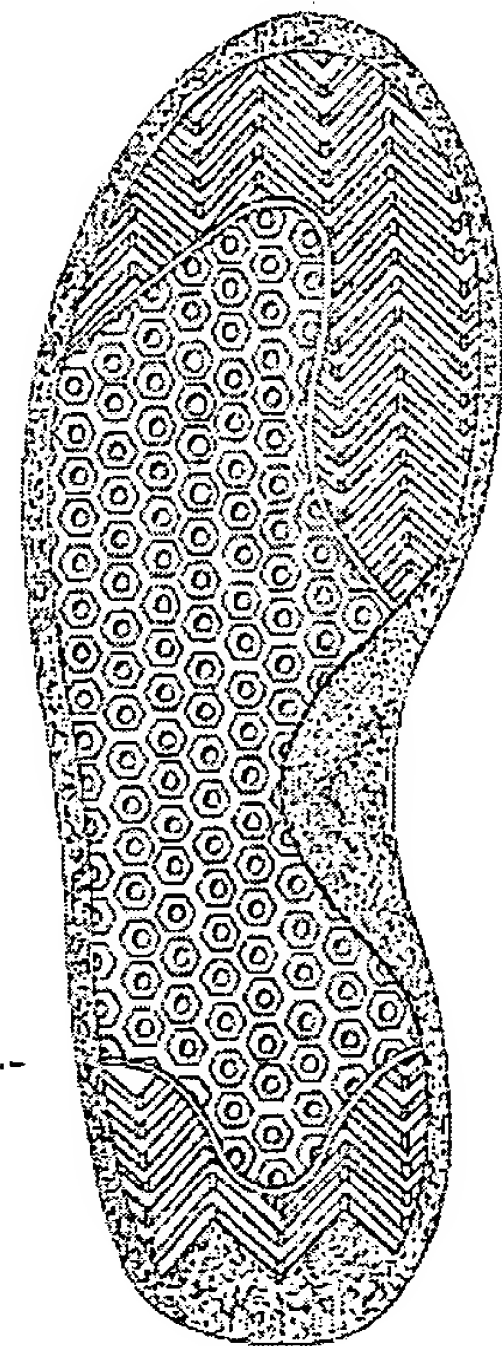
'198 application
(utility patent)



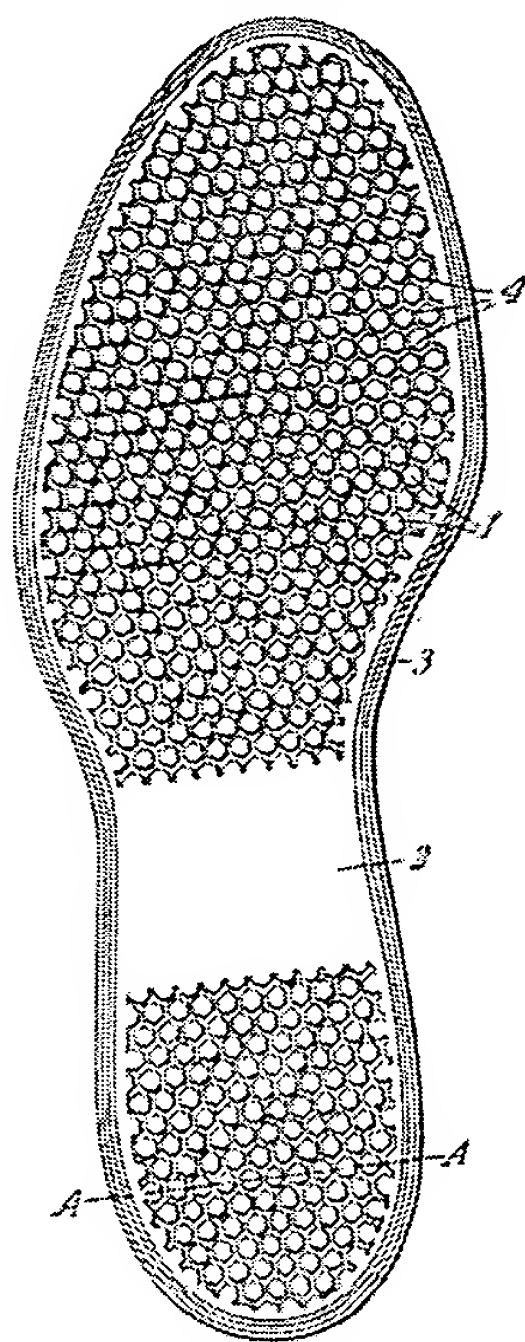
Bowerman
(utility patent)



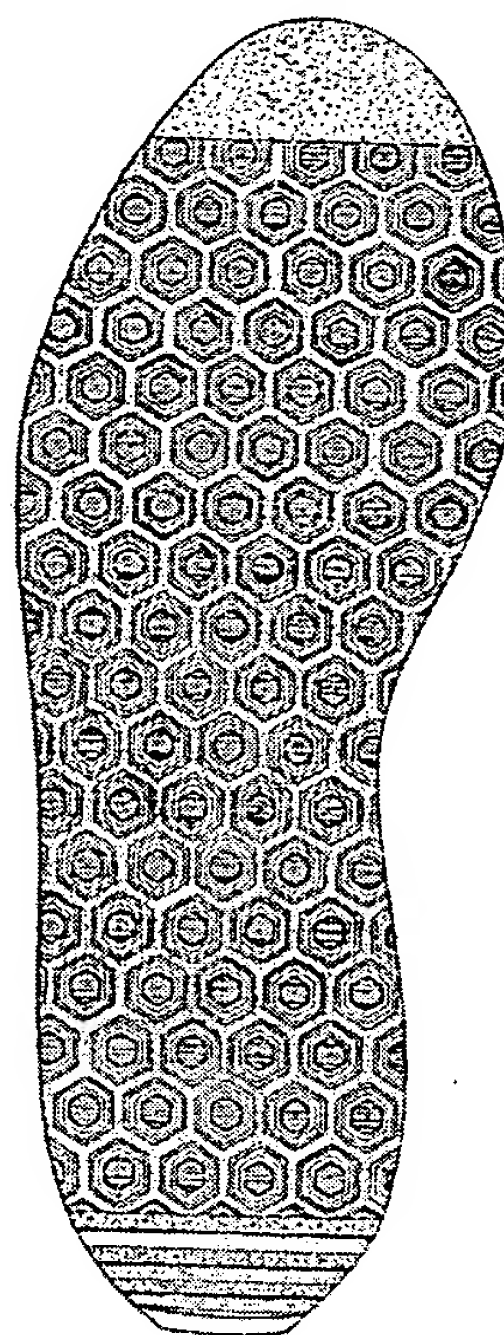
Pope
(design patent)



Davies
(utility patent)



Mastrantuone
(design patent)



The examiner rejected the '198 application, inter alia, on obviousness grounds by considering Pope in light of Bowerman and Davies, and appellants appealed this rejection to the Board. In its decision, the Board reversed the examiner's ground for rejection, supplied an alternative ground for rejection, and remanded. After the Board entered its decision, appellants filed a request for rehearing. The panel held this motion for rehearing in abeyance while the examiner considered the application on remand. After reopening prosecution, the examiner rejected the '198 application for reasons identical to those offered by the Board in its first decision.

Appellants again appealed the examiner's rejection. In its decision, the Board "vacat[ed] the rejection of claim 1 set forth in the earlier decision in favor of the identical rejection later entered by the examiner." Ex parte Fulton, No. 2003-0536, slip op. at 4 (Bd. Pat. App. & Int. Sept. 11, 2003). The Board vacated the rejection in order to alleviate the confusion caused by the appellant in concurrently pursuing a request for a rehearing of the Board's first decision and a new appeal from the final rejection of the '198 application after remand. The Board credited the arguments in both actions. The Board then proceeded to affirm the rejection but under a different line of reasoning. The Board stated:

In the present case, the combined teachings of Bowerman and Pope would have suggested the shoe sole recited in claim 1 to a person having ordinary skill in the art. As indicated above, Bowerman's shoe sole responds to all of the limitations in the claim except for those relating to the hexagonal shaped projected surfaces. While not specifically mentioning hexagonal shaped projected surfaces, Bowerman clearly suggests that cylindrical polygon shaped studs or projections other than those expressly described (square, rectangular or triangular) may be employed to provide sharp edges which bite into artificial turf for good traction. Pope establishes that shoe soles having studs embodying projected surfaces hexagonally shaped and oriented as recited in claim 1 are conventional. Given these disclosures, a person having ordinary skill

in the art would have readily appreciated Pope's known hexagonal shaped projecting surfaces as being particularly well suited for implementing Bowerman's desire for projections having a plurality of sharp edges adapted to bite into artificial turf to obtain good traction. This appreciation would have furnished the artisan with ample suggestion or motivation to combine Bowerman and Pope in the manner proposed so as to arrive at the subject matter recited in claim 1.

Id. at 6-7. After appellants' request for a rehearing was denied, they appealed to this court, which has jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

Discussion

I.

"A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103(a).

Obviousness is a "question of law based on underlying findings of fact." In re Gartside, 203 F.3d 1305, 1316 (Fed. Cir. 2000). The Board's factual findings are upheld unless they are unsupported by substantial evidence. Id. Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." Consol. Edison Co. v. NLRB, 305 U.S. 197, 229-30 (1938). What the prior art teaches, whether it teaches away from the claimed invention, and whether it motivates a combination of teachings from different references are questions of fact. Id.; In re Berg, 320 F.3d 1310, 1312 (Fed. Cir. 2003). Other factual findings related to obviousness may include "(1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness." In re Dembiczak, 175 F.3d

994, 998 (Fed. Cir. 1999), abrogated on other grounds in In re Gartside, 203 F.3d 1305 (Fed. Cir. 2000) (abrogating the holding in In re Dembiczak that the Board's findings of fact are reviewed for clear error); see also Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966).

"When a rejection depends on a combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references." In re Rouffet, 149 F.3d 1350, 1355 (Fed. Cir. 1998). Stated another way, the prior art as a whole must "suggest the desirability" of the combination. In re Beattie, 974 F.2d 1309, 1311 (Fed. Cir. 1992) (internal quotation omitted); Winner Int'l Royalty Corp. v. Wang, 202 F.3d 1340 (Fed. Cir. 2000) ("Trade-offs often concern what is feasible, not what is, on balance, desirable. Motivation to combine requires the latter." (emphasis added)). The source of the teaching, suggestion, or motivation may be "the nature of the problem," "the teachings of the pertinent references," or "the ordinary knowledge of those skilled in the art." In re Rouffet, 149 F.3d at 1355.

II.

As quoted above, the Board found that the prior art as a whole suggested or motivated a combination of the open perimeter and orientation of Bowerman with the hexagonal surface and orientation of Pope. Appellants raise a number of arguments as to why this finding is not supported by substantial evidence.

Appellants first argue that the Board's finding of a motivation to combine lacks substantial evidence because the Board failed to demonstrate that the characteristics disclosed in Pope, hexagonal surfaces in a facing orientation, are preferred over other alternatives disclosed in the prior art. This argument fails because our case law does

not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention. “[T]he question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination,” not whether there is something in the prior art as a whole to suggest that the combination is the most desirable combination available. See In re Beattie, 974 F.2d at 1311 (internal quotation omitted; emphasis added). A case on point is In re Gurley, 27 F.3d 551, 552-53 (Fed. Cir. 1994), in which we upheld the Board’s decision to reject, on obviousness grounds, the claims of a patent application directed to one of two alternative resins disclosed in a prior art reference, even though the reference described the resin claimed by Gurley as “inferior.” Far from requiring that a disclosed combination be preferred in the prior art in order to be motivating, this court has held that “[a] known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use” and the reference “teaches that epoxy is usable and has been used for Gurley’s purpose.” Id. Thus, a finding that the prior art as a whole suggests the desirability of a particular combination need not be supported by a finding that the prior art suggests that the combination claimed by the patent applicant is the preferred, or most desirable, combination.

In this case, the Board found that “Bowerman clearly suggests that cylindrical polygon shaped studs or projections other than those expressly described (square, rectangular, or triangular) may be employed to provide sharp edges which bite into artificial turf for good traction.” Ex parte Fulton, slip op. at 6-7. Bowerman thus provides a motivation to combine its teachings with other prior art references that disclose

cylindrical polygon shapes other than squares, triangles, and rectangles. The Board also found that Pope discloses a shoe sole with hexagonal surfaces, which is a cylindrical polygon-shaped surface, and a facing orientation. Finally, the Board found that no other prior art references taught away from the combination of Bowerman and Pope that it adopted. These secondary findings are sufficient to support a primary finding that the prior art as a whole suggests the desirability of the combination of Bowerman and Pope described by the Board.

Appellants disagree with the Board's finding that no prior art references taught away from the combination of Bowerman and Pope adopted by the Board. Appellants quote language from In re Gurley that "[a] reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant." 27 F.3d at 553. Appellants argue that "the prior art disclosed alternatives to each of the claimed elements A [the perimeter], B [the shape of the surface], and C [the orientation of the surface]. Choosing one alternative necessarily means rejecting the other, i.e., following a path that is 'in a divergent direction from the path taken by the applicant.'" This interpretation of our case law fails. The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed in the '198 application. Indeed, in the case cited by appellants, In re Gurley, we held that the invention claimed in the patent application was unpatentable based primarily on a prior art reference that

disclosed two alternatives, one of which was the claimed alternative. Accordingly, mere disclosure of alternative designs does not teach away.

Here, the design patents in the prior art disclose a number of alternative shoe sole designs but do not teach that hexagonal projections in a facing orientation are undesirable and, therefore, do not teach away. Furthermore, Davies communicates in its specification that its claimed invention, which includes hexagonal surfaces in a pointing orientation, has “a non-skid characteristic effective in all directions relative to its use.” U.K. Patent No. 513,375 (accepted Oct. 11, 1939) at 2, ll. 19-20. But Davies does not teach that hexagons in a facing orientation would be ineffective. Accordingly, we find unpersuasive appellants’ arguments that the prior art teaches away from hexagonal surfaces in a facing orientation.

Appellants next contend that the Board’s finding lacks substantial evidence because it does not show a teaching in the prior art directed to the importance of aligning the cylindrical polygonal studs in a facing orientation. In their patent application, appellants assert that “[t]his general orientation [a facing orientation] of the surfaces 36 has been found optimal for slip resistance in the sole of a shoe, in which there is a predetermined, usual or ordinary direction of travel.” (Emphasis added.) Appellants’ argument is unpersuasive from a legal standpoint because it again relies on the mistaken premise that the prior art must teach that a particular combination is preferred, or “optimal,” for the combination to be obvious. Furthermore, as we emphasized in In re Beattie, “[a]s long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the references be combined for the reasons contemplated by the inventor.” 974 F.2d at

1312. Accordingly, this argument is unpersuasive because the Board need not have found the combination of Bowerman and Pope to be desirable for the reason stated in the '198 application.

This argument also fails on the facts of this case because the Board's findings are sufficiently broad to encompass appellants' idea of using a facing orientation because the predominant direction of travel is forward. The Board's finding that other cylindrical polygon shapes "may be employed to provide sharp edges which bite into artificial turf for good traction" suggests the importance of orientation because "bite" comes primarily from the front and back edges of the contact surface of a multi-sided stud being oriented so that the front edge faces the direction of travel and the back edge is directly opposite, as disclosed in Bowerman. See Bowerman, col. 2, ll. 55-60, figs. 2, 4. Indeed, in a discussion of "bite," Bowerman refers to Figures 2 and 4 of its specification, which depict a facing orientation. Id. Bite may also arise from the other edges of the contact surface, as well as edges formed by the intersection of the sides of the stud.

The Board also found that "a person having ordinary skill in the art would have readily appreciated Pope's known hexagonal shaped projecting surfaces as being particularly well suited for implementing Bowerman's desire for projections having a plurality of sharp edges adapted to bite into artificial turf to obtain good traction." Ex parte Fulton, slip op. at 6-7. Reasons why a hexagonal surface would be well-suited for obtaining good traction include the fact that the greater number of edges in a hexagon over a square provide bite in more directions. Further, although the Board's finding could perhaps have been clearer, it encompasses appellants' claim that a facing

orientation is desirable because it provides bite in the forward direction. The Board's finding states that a person of ordinary skill of the art would have recognized that hexagonal surfaces as in Pope are "particularly well suited" to provide bite. Id. By referring to Pope, which has a facing orientation, rather than patents in the examination record that disclosed a pointing orientation, the Board's finding recognizes the importance of a facing orientation and, therefore, also the importance of providing "bite" in the forward direction.

Appellants finally contend that the Board did not properly weigh the prior art as required by In re Young, 927 F.2d 588 (Fed. Cir. 1991), and did not provide sufficient reasoning for its rejection of these references as required by In re Lee, 277 F.3d 1338 (Fed. Cir. 2002). Although the Board's analysis is short, the Board's decision is not so lacking in comparative reasoning that it fails under In re Young or In re Lee. The Board clearly considered the prior art cited by appellants and provided a factual basis upon which we can affirm its decision.

III.

The Board sustained the examiner's rejection of the dependent claims of the '198 application because "appellants have not challenged such with any reasonable specificity, thereby allowing these claims to stand or fall with parent claim 1." Ex parte Fulton, slip op. at 8. In its briefing before this court, appellants have also not raised any arguments related solely to the dependent claims. Accordingly, because we affirm the Board's decision as to claim 1 of the '198 application, we also affirm the Board's decision as to the dependent claims.

Conclusion

In sum, the Board found that the prior art as a whole suggested or motivated a combination of the open perimeter of Bowerman with the hexagonal surface and facing orientation of Pope. Because this finding was supported by substantial evidence, we affirm the Board's rejection of the claims of the '198 application.

AFFIRMED